



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

0000035

EPA Region 5 Records Ctr.



226191

REPLY TO THE ATTENTION OF

MEMORANDUM

DATE: JUL 17 2002

SUBJECT: ACTION MEMORANDUM - Determination of Threat to Public Health or the Environment and Need for Time Critical Removal Action at the Family Golf Course/Lake Shore East Site Chicago, Cook County, Chicago, Illinois (Site Spill ID #05YT)

FROM: *Verneta Simon* *Fam*
Verneta Simon and Fred Micke, On-Scene Coordinators
Emergency and Enforcement Response Branch - Section III

TO: William E. Muno, Director
Superfund Division

THRU: Richard C. Karl, Chief *R. Karl*
Emergency Response Branch

I. PURPOSE

The purpose of this Memorandum is to document the determination of an imminent and substantial threat to public health and the environment posed by radioactive materials present at portions of the Family Golf Course/ Lake Shore East Site, presently a driving range and golf course and the proposed site of a major 26 acre mixed-use development including residential, commercial, educational, and recreational areas that is slated for construction during the summer of 2002. The site is located at approximately 221 North Columbus Drive in Chicago, Illinois. There is a period of less than six months available before cleanup activities must begin at this site consequently this must be characterized as a time-critical removal that we anticipate will be carried out by potentially responsible parties or the buyer.

In July and August 2001, both the current owners and future prospective buyer of portions of the parcel conducted surveys for gamma radiation and sampled subsurface soils, following U.S. EPA's walk-over survey on June 19, 20, and 29, 2001 that had

shown several areas of elevated gamma radiation. The property owners and the purchasers provided U.S. EPA with the sampling results of the radioactive materials discovered at the property. In the Streeterville area, on the north perimeter of the Chicago Loop, U.S. EPA has ordered two major removal actions since 1993 involving radioactive thorium and another is planned for the summer of 2002. The contaminant of concern at the Family Golf Course/Lake Shore East Site is also thorium and based on the proximity of the contamination to Lindsay Light, the dates of Lindsay operation and the dates of filling activities in the former ship slips along the Chicago River, its likely original source was the Lindsay Light Company, a Streeterville thorium processor and gas mantle manufacturer in the early third of the 1900's.

This site is not on the National Priorities List (NPL).

II. SITE CONDITIONS AND BACKGROUND

CERCLIS ID # N/A

Currently, 221 North Columbus Drive is a driving range and nine-hole golf course. In the future, it will become a mixed-use residential neighborhood for 30,000 people.

Details about the Lindsay Light sites in Streeterville are provided in previous Action Memoranda dated July 11, 1994, October 5, 1995, April 22, 1996, and September 22, 1999, which describe site conditions and background.

Sampling results obtained by both buyer and seller are contained in its entirety in the Administrative Record. Sampling has demonstrated that thorium is present at levels substantially exceeding the clean-up criteria for the Streeterville Lindsay Light Sites, 7.1 picocuries per gram (pCi/g) total radium (Ra-226 + Ra-228). In the non-EPA soil samples, the site background was about 2 picocuries per gram total radium (radium-226 + radium-228) while the peak concentration was about 190 pCi/g total radium. In the non-EPA survey, the site gamma count rate background was about 6500 counts per minute while the peak level was about 625,000 counts per minute.

An Action Memorandum is deemed necessary to address an imminent and substantial endangerment to human health and the environment by ensuring proper management of the thorium wastes. At other Lindsay Light Sites, U.S. EPA oversight assured Work Plans, Quality Assurance Plans, and Health and Safety Plans were developed and implemented expeditiously and thoroughly. It assured surveillance and verification was conducted according to protocols deemed most appropriate by U.S. EPA. For this site, U.S. EPA oversight also would ensure defensible laboratory protocols by contractors.

With such a large and complex project, potentially involving so many parties, it is best to resolve the radiation issues early and with thoroughness so that they do not arise as major obstacles later in the development. The Action Memorandum is an effective means of assuring early resolution.

Therefore, it is necessary to enter into an Administrative Order with the sellers and/or buyer to assess the extent of contamination and then to undertake remediation prior to construction. For this particular site, it was not recommended to pursue remediation and construction simultaneously because past experience at the Grand Pier Lindsay Light II removal site indicates that concurrent construction and remediation required additional agency resources and created health and safety risks that required additional management efforts.

An environmental justice (EJ) analysis was performed for this site and is contained in Attachment 3. In Illinois, the low-income percentage is 27 % and the minority % is 25. To meet EJ concern criteria, the area within 1 mile of this property must have a population that is twice the state low income percentage or/and twice that state minority percentage. That is, the area must be at least 54% low-income and/or 50% minority. At this site, the low-income percentage is 10.05 % and minority percentage is 19.64%, as determined by Arcview. Therefore, this site does not meet the region's EJ criteria based on the demographics as identified in "Region 5 Interim Guidelines for Identifying and Addressing a Potential EJ Case, June 1998".

III. THREAT TO PUBLIC HEALTH OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

Conditions at the Family Golf Course/Lake Shore East Site may pose an imminent and substantial endangerment to public health or welfare or the environment, based upon factors set forth in the National Contingency Plan (NCP), 40 CFR 300.415 (b)(2).

These factors include:

a) actual or potential exposure to nearby populations, animals, or the food chain from hazardous substances or pollutants or contaminants:

This factor is present at the site due to the presence of elevated gamma count rate readings that were documented by U.S. EPA on June 19, 20, and 29, 2001 to be as high as 625,000 counts per minute. Counts per a minute in uncontaminated areas of the site were generally about 6500 counts per minute.

In addition, construction is planned to begin at portions of this site in July 2002. Construction and utility workers may be exposed to these contaminants.

b) high levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate:

During July and August 2001, soil samples were collected by the Site sellers and buyer and the highest sample result as of the preparation of this Action Memorandum was 190 picoCuries per gram (pCi/g) total radium including a background level of about 2 pCi/g. The clean-up level applied to the Lindsay Light Sites directly across the Chicago River was 7.1 pCi/g total radium, including background.

c) other situations or factors which may pose threats to public health or welfare or the environment:

Thorium contamination was detected across the Chicago River in at least four locations and possibly two more locations, and under the streets and sidewalks in the "Streeterville" neighborhood on the North side of the Chicago river. There is reason to suspect additional contamination exists since 221 North Columbus is a

former Illinois Central Railroad yard that may have received shipments of thorium-containing ores for Lindsay Light and had four boat slips that were filled during the period of Lindsay Light operation. A book, They Built Chicago by Miles L. Berger, has a 1936 photograph showing the slips at 221 North Columbus.

IV. ENDANGERMENT DETERMINATION

Given the nature of the Site, the nature of the contaminants - radioactive materials are carcinogens where the health detriment is caused by external exposure, inhalation, ingestion, and direct contact hazards, as described in Sections II and III and the actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action described in this Action Memorandum, may pose an imminent and substantial endangerment to public health, or welfare, or the environment due to these radioactive materials.

V. PROPOSED ACTIONS AND ESTIMATED COSTS

Pursuant to an Administrative Order, the Site sellers and/or buyer will fully remediate the site until maximum protectiveness of the human health and the environment is achieved. This will involve at a minimum the following actions.

- 1) Develop a Work Plan for the radiological assessment of the site.
- 2) Develop a Quality Assurance Plan.
- 3) Develop and implement a radiological site health and safety plan.
- 4) Conduct land surveying to the extent necessary to establish a grid system to locate all property boundaries, special features (pipes, storage tanks, etc.), and sample locations.
- 5) Place borings in critical locations (grid corners, high exposure rate areas, special features, etc.) for the purpose of measuring subsurface radiation levels. Measurements shall be recorded at each 6 inch depth until the natural soils are

reached or radiation levels reach background, whichever is the greatest depth.

- 6) Collect soil samples from the borings and analyze for radionuclide content and RCRA characteristics. These results will then be used by the PRP or buyer to correlate subsurface radiation levels and radionuclide content.
- 7) Conduct off-site radiological surveying and sampling as necessary and, at a minimum, implement 40 CFR 192 if deemed necessary should extensive contamination be discovered beyond current site boundaries.
- 8) Based upon soil results, remove, transport and dispose of all characterized or identified hazardous substances, pollutants, wastes or contaminants at a RCRA/CERCLA approved disposal facility in accordance with the U.S. EPA off-site rule.

The OSCs have begun planning for the provision of post-removal site control, consistent with the provisions of Section 300.415(k) of the NCP. However, the nature of future response actions should eliminate all exposure threats, which should minimize the need for post-removal site control. Currently, it appears that the contamination is shallow, however, if on-site work demonstrates differently then either a deed restriction or change in design to green space should be implemented.

The response actions described in this memorandum directly address actual or threatened releases of hazardous substances, pollutants or contaminants at the facility which may pose an imminent and substantial endangerment to public health and safety, and to the environment. These response actions do not impose a burden on the affected property disproportionate to the extent to which that property contributes to the conditions being addressed.

Applicable or Relevant and Appropriate Requirements (ARARS)

All applicable or relevant and appropriate requirements (ARARS) of federal and state law will be complied with to the extent practicable. The Atomic Energy Act of 1954, section 11(e)(2) defines one type of "by product" as "tailings of wastes produced by the extraction or concentration of uranium or thorium from ore

processed primarily for its source material content." In correspondence dated June 4, 1996, the Illinois Department of Nuclear Safety (IDNS) informed U.S. EPA that its licensing staff had determined that the radioactive material associated with the former Lindsay Light facility located at 316 East Illinois Street in Chicago was "by product" material as defined by Section 11(e)2 of the Atomic Energy Act. The IDNS determination letter is contained in Attachment 1. Such 11(e)(2) by-product material must be disposed of at sites licensed by the Nuclear Regulatory Commission (or NRC-agreement states). In the past, all the radioactive waste from Lindsay Light Streeterville sites has been sent off site for disposal at such licensed sites.

In January 2001, however, the NRC determined if a facility that produced radioactive tailings but was not licensed by NRC or an NRC-agreement state when the Uranium Mill Tailings Radiation Control Act ("UMTRCA") became effective in 1978 or thereafter, then material from a site containing such tailings does not qualify as 11(e)(2) byproduct. The NRC also determined that the AEA does not apply to such "pre-78" (or "pre-UMTRCA") waste, that the AEA does not give the NRC jurisdiction over such waste, and that it does not have to be disposed of at NRC-licensed sites. The thorium tailings associated with the Lindsay Light Streeterville sites were produced from approximately 1904 to 1933 and long pre-date the AEA and UMTRCA. Nonetheless, because the pre-78 tailings have the same radioactive properties as the post-UMTRCA waste, the substantive regulations governing the management of pre-UMTRCA Lindsay Light radioactive tailings are relevant and appropriate requirements for the disposal standards for pre-UMTRCA radioactive tailings.

In light of the January 2001 NRC decision, and in accordance with the revised NCP, Section 300.825(a)(1), U.S. EPA will the request that the State also consider the ARARs and the State's response will be added to the administrative record for this site once the response has been received and evaluated.

VI. CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED

Delayed or non-action may result in increased likelihood of external exposure, inhalation, ingestion or direct contact to human populations accessing and working on the site. Also, since

there is no threshold for radiological risk, additional exposure to radiological materials will increase the cancer risk.

VII. OUTSTANDING POLICY ISSUES

None.

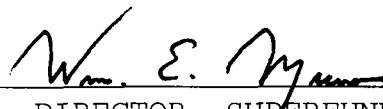
VIII. ENFORCEMENT

For administrative purposes, information concerning confidential enforcement strategy for this site is contained in the Enforcement Confidential Addendum.

IX. RECOMMENDATION

This decision document represents the selected removal action for the Family Golf Course/Lake Shore East site, in Chicago, Illinois, developed in accordance with CERCLA, as amended, and is not inconsistent with the NCP. This decision is based upon the Administrative Record for this site. Conditions at the site meet the NCP Section 300.415(b)(2) criteria for a removal action.

APPROVE:



DIRECTOR, SUPERFUND DIVISION

7/17/02

DISAPPROVE:

DIRECTOR, SUPERFUND DIVISION

Attachments: Enforcement Confidential Addendum

1. Letter Dated June 4, 1996 from the Illinois Department of Nuclear Safety to U.S. EPA
2. Index to the Administrative Record
3. Environmental Justice Analysis

cc: Kevin Mould, U.S. EPA 5202G

Mike Chezik, U.S. Department of Interior, w/o Enf. Addendum

Renee Cipriano, Illinois Environmental Protection Agency,
w/o Enf. Addendum
Steve Davis, Illinois Department of Natural Resources,
w/o Enf. Addendum
Naren Prasad, City of Chicago Department of Environment,
w/o Enf. Addendum
Benet Haller, City of Chicago Department of Planning and
Development, w/o Enf. Addendum

BCC PAGE

HAS BEEN REDACTED

NOT RELEVANT TO THE SELECTION OF THE REMOVAL ACTION

**ENFORCEMENT CONFIDENTIAL AGREEMENT
LINDSAY LIGHT II/OU5 LAKESHORE EAST
JULY 2002**

HAS BEEN REDACTED

NOT RELEVANT TO THE SELECTION OF THE REMOVAL ACTION

STATE OF ILLINOIS
DEPARTMENT OF NUCLEAR SAFETY
1035 OUTER PARK DRIVE
SPRINGFIELD, ILLINOIS 62704

Jim Edgar
Governor

217-785-9900
217-782-6133 (TDD)

Thomas W. Ortoger
Director

June 4, 1996

Ms. Verneta Simon
On-Scene Coordinator
U.S. EPA Region 5
77 West Jackson Boulevard
Chicago, IL 60604-3590

Dear Ms. Simon:

This is in response to your letter of June 2, 1996 relative to the identification of ARARs for the Lindsay Light II Site in Chicago. In August 1995, Kerr-McGee provided this Department additional information concerning the former use of the 316 East Illinois Street facility. Based on that information, our licensing staff determined that the radioactive material is byproduct material as defined in Section 11(e)2 of the Atomic Energy Act.

Given that the contaminant of concern is byproduct material, just like the West Chicago Residential Areas Superfund Site, we suggest that the list of ARARs used for that site would be appropriate for Lindsay Light II as well. That list of ARARs appears in the Final Criteria for Superfund Removal Actions at the Residential Areas Site. This is a November 19, 1993 memo from Regional Administrator Adamkus. A copy is attached for your reference.

Thank you for consulting with us in your development of ARARs.

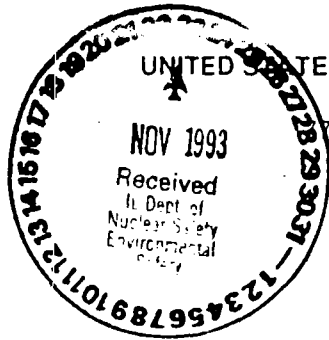
Sincerely,



Richard Allen, Manager
Office of Environmental Safety

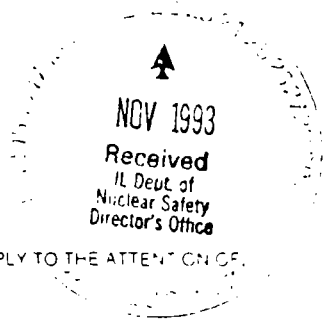
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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5

WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590



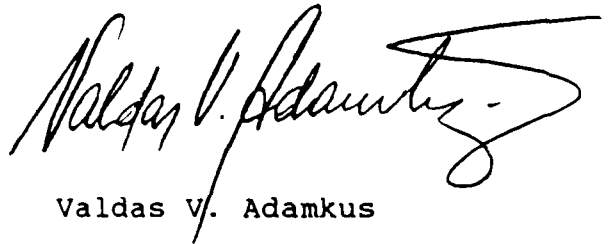
DATE: November 19, 1993

RE: U.S. EPA's Final Criteria for Superfund Removal Actions
at the Kerr-McGee Residential Areas Site, West Chicago,
Illinois

FROM: Valdas V. Adamkus
Regional Administrator

TO: Addressees

Please find attached a copy of the Final Criteria for Superfund Removal Actions at the Kerr-McGee Residential Areas Site. U.S. EPA will be conducting a public meeting on December 9, 1993, to present the final criteria to the general public. My staff will provide you with details on the public meeting in a separate mailing. If you have any questions concerning the criteria, please feel free to contact me or Rebecca Frey, Remedial Project Manager, at (312) 886-4760.


Valdas V. Adamkus

Addressees

- Scott Palmer
- Sen. Doris Karpel
- Rep. Tom Johnson
- Dave Engel
- Don Foster
- Joe Karaganis
- Steven Lakics
- Francis Lyons
- Tom Ortogier
- Dave Ed
- Bill Seith
- Ray Hansen

ACTION CRITERIA
FOR SUPERFUND REMOVAL ACTIONS
AT THE KERR-McGEE RESIDENTIAL AREAS SITE
WEST CHICAGO, ILLINOIS

Prepared by
U.S. EPA Region 5

November 1993

ACTION CRITERIA
FOR SUPERFUND REMOVAL ACTIONS
AT THE KERR-McGEE RESIDENTIAL AREAS SITE
WEST CHICAGO, ILLINOIS

Introduction

Under the provisions of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (commonly known as Superfund), as amended by the Superfund Amendments and Reauthorization Act of 1986, the United States Environmental Protection Agency (U.S. EPA) is authorized, among other things, to take response actions whenever there is a release or threat of a release of a hazardous substance into the environment. The National Priorities List (NPL) is a list of hazardous waste sites across the country that are eligible for U.S. EPA response actions under Superfund.

The U.S. EPA has listed four sites in the vicinity of the City of West Chicago, Illinois, on the NPL. The primary contaminants of concern at these sites are radioactive thorium and its decay products derived from ore processing operations at a factory in West Chicago, now known as the Kerr-McGee Chemical Corporation West Chicago Rare Earths Facility ("factory site"). Three of the NPL sites became contaminated when the processing wastes (thorium mill tailings) were removed from the factory and used primarily as fill material in and around the City of West Chicago. These sites are known as:

- (1) Kerr-McGee (Residential Areas) site,
- (2) Kerr-McGee (Sewage Treatment Plant) site, and
- (3) Kerr-McGee (Reed-Keppler Park) site.

The fourth site became contaminated when discharges and runoff from the factory site traveled via a storm sewer into nearby Kress Creek and downstream to the West Branch of the DuPage River. This site is known as:

- (4) Kerr-McGee (Kress Creek/West Branch of DuPage River) site.

It is important to note that the Residential Areas site may encompass not only residential properties, but also institutional, commercial and municipal properties. Although primarily contaminated because thorium mill tailings were used as fill, some of the properties may have become contaminated due to windblown material from the factory site.

The Kerr-McGee factory site from which the contamination originated has not been listed on the NPL; it is regulated under the licensing authority of the Illinois Department of Nuclear Safety (IDNS). Decommissioning, clean-up and closure of the factory site currently is being addressed under that authority.

Purpose and Intent

The purpose of this document is to establish criteria for U.S. EPA's response actions at contaminated properties ("Residential Areas") that are not part of the Sewage Treatment Plant, Reed-Keppler Park or Kress Creek/West Branch of DuPage River sites. Those three NPL sites will be addressed by U.S. EPA in separate actions.

It is the intent of the U.S. EPA to address the contamination problems at the Residential Areas by removal actions wherever practicable. Removal actions generally provide more immediate protection than do long-term remedial actions, and are consistent with the movement in the Superfund program to accelerate site cleanups.

U.S. EPA's actions under Superfund will be limited to those properties where the contamination is attributed to process wastes (thorium mill tailings) from the factory site. When naturally occurring radioactive materials not associated with process wastes cause U.S. EPA's action criteria to be exceeded, any corrective actions will have to take place through a separate mechanism, because Superfund generally does not give U.S. EPA the authority to remediate threats from naturally occurring substances.

This document contains the criteria that U.S. EPA will use to designate properties for removal actions and to verify that cleanup to levels protective of human health and the environment has been achieved. The U.S. EPA does not have standardized criteria for removal actions of this type. Consequently, site-specific criteria have been developed by the U.S. EPA in consultation with the IDNS for use at the Residential Areas. The criteria specified in this document will be used during three separate phases of the cleanup action: the discovery phase, the characterization phase, and the verification phase. Each of these phases and the criteria for each are described in detail later in this document. This document also contains release criteria for releasing equipment from work sites for unrestricted use.

Applicable or Relevant and Appropriate Requirements

Under Superfund, long-term remedial actions must attain Federal and more stringent State "applicable or relevant and appropriate requirements" (ARARs) during and at the completion of the remedial action. Removal actions (such as the type planned at the Residential Areas) must attain ARARs to the extent practicable. Therefore, U.S. EPA relied upon Federal and State ARARs to the extent practicable to establish the criteria in this document.

"Applicable requirements" are cleanup standards or other environmental protection requirements that specifically apply to the substances or activities at the site. In other words, an applicable requirement is one that a private party would have to comply with by law if the same action was being taken apart from Superfund authority.

If a requirement is not applicable, it still may be relevant and appropriate. "Relevant and appropriate requirements" are those cleanup standards that address problems or situations sufficiently similar to those at the Superfund site that their use is well suited to the particular site. A relevant and appropriate requirement must be both relevant to the conditions at the site and appropriate for use at the site, given the circumstances.

If a Federal or State requirement is neither applicable nor relevant and appropriate (and thus not an ARAR), it still may be useful to U.S. EPA when determining the necessary level of cleanup for protection of human health and the environment. Such "to-be-considered" material (TBCs) can include

promulgated regulations that do not qualify as ARARs, and non-promulgated advisories or guidance issued by Federal or State government. Superfund actions are not required to meet TBCs.

Only requirements that are duly promulgated under Federal or State law can be ARARs. Additionally, only substantive requirements of regulations, not procedural requirements, can be ARARs for on-site actions.

The U.S. EPA has identified the following major sources of ARARs and TBCs for the cleanup actions at the Residential Areas:

Title 40, Part 192 of the Code of Federal Regulations (40 CFR 192), entitled "Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings" - 40 CFR 192 contains U.S. EPA's standards for cleanup of lands contaminated by uranium and thorium mill wastes. The standards apply only to the sites specifically designated under the Uranium Mill Tailings Radiation Control Act of 1978, but they often have been used as criteria at uranium, thorium and radium sites because of the similarity of the problems. They are not applicable to the Residential Areas, but U.S. EPA considers portions to be relevant and appropriate.

Title 32, Chapter II, Subchapter b, Part 332 of the Illinois Administrative Code, entitled "Licensing Requirements for Source Material Milling Facilities" - These regulations deal with licensing requirements for source material milling facilities in Illinois and apply to the Kerr-McGee factory site in West Chicago. They are not applicable to the Residential Areas, but U.S. EPA considers portions to be relevant and appropriate and portions to be TBCs.

Title 32, Chapter II, Subchapter b, Part 340 of the Illinois Administrative Code, entitled "Standards for Protection Against Radiation" - These regulations establish standards for protection against radiation hazards, primarily in an occupational setting; they control the possession, use and transfer of sources of radiation by "licensees and registrants" so that the total dose to an individual does not exceed specified standards. They also contain decontamination guides for the release of equipment for unrestricted use. These regulations are not applicable to the Residential Areas, but U.S. EPA considers portions to be relevant and appropriate.

DOE Order 5400.5, entitled "Radiation Protection of the Public and the Environment" - This Order establishes standards and requirements for Department of Energy (DOE) operations with respect to protection of members of the public against undue risk from radiation, and contains a discussion of DOE's "ALARA" (As Low As Reasonably Achievable) approach. The Order is not a promulgated Federal or State regulation, and thus cannot be an ARAR, but U.S. EPA considers portions of the Order to be TBCs.

Title 10, Part 20 of the Code of Federal Regulations (10 CFR 20), entitled "Standards for Protection Against Radiation" - These regulations contain the Nuclear Regulatory Commission's standards for protection against radiation, and contain an "ALARA" approach. They are not applicable or relevant and appropriate to the Residential Areas, but U.S. EPA considers portions to be TBCs.

U.S. Nuclear Regulatory Commission's Regulatory Guide 8.37 - This regulatory guide contains, among other things, a discussion of the NRC's "ALARA" approach. The regulatory guide is not a promulgated regulation, and thus cannot be an ARAR, but U.S. EPA considers a portion of the guide to be a TBC.

U.S. Nuclear Regulatory Commission's Regulatory Guide 1.86 - This regulatory guide contains, among other things, decontamination guides for the release of equipment for unrestricted use. The regulatory guide is not a promulgated regulation, and thus cannot be an ARAR, but U.S. EPA considers a portion of the guide to be a TBC.

The Action Criteria

The remainder of this document describes the different phases of the cleanup action, the specific Federal and State requirements that U.S. EPA considers to be ARARs or TBCs, and the resulting action criteria for each phase of the cleanup action.

DISCOVERY AND CHARACTERIZATION PHASES

The first phase of the cleanup action is the discovery phase. During this phase, properties in and around the City of West Chicago will be surveyed and sampled to discover and designate those that require cleanup. If a property clearly exceeds the discovery criteria, and if it is clear that the exceedance is due to thorium mill tailings from the factory site, the property will be designated for removal action. If it is not clear whether a property exceeds the discovery criteria (i.e., borderline results), or if it is not clear whether exceedance of the criteria is due to thorium mill tailings, then further investigation will be needed before a decision can be made to designate that property for response action. Such properties will move into the characterization phase.

Because the objective of both discovery and characterization is the same (i.e., to find contaminated properties), the action criteria during these two phases are identical. Properties deemed not to exceed the action criteria during either discovery or characterization will be excluded from further consideration.

Due to the nature of the radiological contamination at the Residential Areas, survey efforts during the discovery phase will consist of measuring and/or sampling the following four parameters: outdoor soil concentration, outdoor

gamma exposure rate, indoor gamma exposure rate and indoor radon/thoron air concentration.

The primary criterion that will be used to designate a property for response action is outdoor soil concentration. The other three parameters (outdoor gamma exposure rate, indoor gamma exposure rate and indoor radon/thoron air concentration) will be used as indicators or "finding tools" to help locate contaminated areas; elevated readings for any of these three parameters alone generally will not trigger a cleanup action unless combined with soil sampling data that exceeds the soil concentration criterion and confirms the presence of thorium mill tailings.

The U.S. EPA has taken a conservative approach with the discovery and characterization criteria in order to minimize the chances of not discovering properties where contamination actually is present. As a result, the discovery criteria may be more stringent than the verification criteria (e.g., for outdoor soil concentrations, the results will not be averaged over 100 square meters during discovery and characterization, but averaging over 100 m² may be conducted during the verification phase).

For indoor radon/thoron, the necessity for expeditious surveillance argues for measurements on a shorter time frame than the annual average (or equivalent) associated with the wording of the relevant and appropriate requirement. In order to not unduly delay assessments, discovery and characterization measurement periods may be on the order of 2 days to 3 months. Since weather, seasons and home usage all influence indoor radon/thoron levels, these shorter measurements may not fully characterize the annual average but should be adequate to serve as "finding tools." Also, many homes may have elevated levels of naturally occurring radon that are not associated with the presence of thorium mill tailings on the property. For these reasons, an elevated reading of indoor radon/thoron will not trigger a cleanup action unless combined with soil sampling data that exceeds the soil concentration criterion and confirms the presence of thorium mill tailings.

Discussed below are the criteria that will be used during the discovery and characterization phases of the response action:

- Outdoor Soil Concentration

Soil standards for mill tailings of the type present at the Residential Areas are found in 40 CFR 192, "Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings," and at Section 332.150(b) of the Illinois Administrative Code. None of the standards are applicable to the Residential Areas, but portions are relevant and appropriate. Because the State standard is more stringent than the Federal standard (by specifying that the concentration limit is for dry soil), the State regulation is considered as the ARAR.

The State regulation at Section 332.150(b) of the Illinois Administrative Code specifies that the licensed site shall be

decontaminated to the following limits prior to termination of the license:

"Concentrations of radionuclides in soil above background concentrations for total radium, averaged over areas 100 square meters, shall not exceed:

- A) 5 picocuries per gram of dry soil, averaged over the first 15 centimeters below the surface; and
- B) 15 picocuries per gram of dry soil, averaged over layers of 15 centimeters thickness more than 15 centimeters below the surface."

The State requirements in Section 332.150(b) of the Illinois Administrative Code were based on the federal standards in 40 CFR 192.12(a). When the federal standards in 40 CFR 192 were developed over a decade ago, the 5 picocuries per gram (pCi/g) standard was a health based standard, but the 15 pCi/g standard for subsurface soil was technology based, reflecting instrument limitations in locating subsurface deposits. The 15 pCi/g limit is not a health-based standard, and should not be applied to situations in which a health-based standard is appropriate, or to situations that differ substantively from those for which it was derived.

The 15 pCi/g limit was developed as a practical measurement tool for use in locating discrete caches of high activity tailings (typically 300-1000 pCi/g) that were deposited in subsurface locations at mill sites or at nearby properties. The subsurface soil standard in 40 CFR 192 was originally proposed as 5 pCi/g. The final standard was changed, not because the health basis was relaxed, but rather in order to reduce the cost to DOE of locating buried tailings - under the assumption that this would result in essentially the same degree of cleanup at the DOE sites as originally proposed under the 5 pCi/g criterion. The use of a 15 pCi/g subsurface criterion allowed the DOE to use field measurements rather than laboratory analysis to determine when buried tailings had been detected. It is only appropriate for use as a cost-effective tool to locate radioactive waste in situations where contaminated subsurface materials are of high activity and are not expected to be significantly admixed with clean soil. The 15 pCi/g subsurface criterion was not developed for situations where significant quantities of moderate or low activity materials are involved, such as at the Residential Areas site. Therefore, the 15 pCi/g subsurface criterion is not appropriate for use at the Residential Areas site, and thus is not an ARAR. The 5 pCi/g standard, on the other hand, was developed as a health-based standard and is appropriate for use at the Residential Areas site.

Although the soil concentration standard in the regulation is written in terms of an average over an area of 100 square meters, areal averaging will not be conducted during discovery and characterization. This approach is conservative and should minimize the chances of not identifying contamination during the discovery and characterization surveys.

Therefore,

The Discovery and Characterization Criterion for outdoor soil concentrations will be exceedance of 5 picocuries per gram total radium (radium-226 plus radium-228), dry soil, above background in any 15 centimeter depth based upon Section 332.150(b) of the Illinois Administrative Code.

- Outdoor Gamma Exposure Rates

Section 332.150(b) (2) of the Illinois Administrative Code, "Termination of Source Material Milling Facility License," deals with a site licensed by IDNS that is to be decontaminated for license termination. It states that the licensed site shall be decontaminated to the following limits prior to termination of the license:

"The level of gamma radiation measured at a distance of 100 centimeters from the surface shall not exceed background."

This regulation applies only to a licensed site, but the requirements are relevant to the Residential Areas since the intent of the standards is to limit public exposure from site-related radioactive materials.

The variability and distribution of naturally-occurring radioactive materials results in a range of normal background levels, even within a small region such as a few mile radius around West Chicago. In part, this originates from variable geological constituents and in part from human actions (such as phosphate fertilization which can add additional radium to the soil). Consequently, there is not a single number that can be said to be "background" for the entire West Chicago region. While not represented by a single number, the normal background levels of gamma exposure rate will fall within a range and in a fairly predictable statistical pattern. Consequently, a statistical method will be applied to both establish background and what is distinctly above background.

Because there are sources unrelated to thorium mill tailings (such as phosphate fertilizers) that could cause elevated gamma readings at the Residential Areas, it is not appropriate to use the background gamma standard during the discovery phase as a strict, single criterion that, in and of itself, triggers cleanup. However, U.S. EPA will use measurements of outdoor gamma exposure rate as a "finding tool" to locate those areas that are statistically distinct from background. Gamma readings found to be statistically distinct from background at a property will be an indication of possible thorium mill tailings contamination. Such areas will, at a minimum, be investigated further. Elevated gamma readings alone generally will not trigger a cleanup action unless combined with soil sampling data that exceeds the soil concentration criterion and confirms the presence of thorium mill tailings.

Because the background gamma standard will be used extensively as a "finding tool" and not as a strict criterion, exposure rates may be measured at varying heights from the ground surface (typically, 0 to 1 meter), depending on detection sensitivities, practicality, and other conditions encountered in the field.

Therefore,

The Discovery and Characterization Criterion for outdoor gamma exposure rate will be the statistical exceedance of background based upon the Illinois Administrative Code, Section 332.150(b)(2).

- Indoor Gamma Exposure Rates

The only promulgated standard that specifically deals with indoor gamma exposure rate is 40 CFR 192.12(b)(2), which states that the objective of remedial action shall be that

"In any occupied or habitable building--...The level of gamma radiation shall not exceed the background level by more than 20 microroentgens per hour."

Gamma-ray exposure to 20 microroentgens per hour for a substantial portion of the year could result in an annual dose exceeding 100 millirem, due solely to external exposure to gamma rays.

Recommendations by eminent bodies of radiation scientists, and regulations and policies of federal agencies such as the Nuclear Regulatory Commission and the Department of Energy, are to limit doses to members of the general public to less than 100 millirem per year, including both external exposure (from gamma rays) and internal exposure (from inhalation and ingestion). In addition, NRC's regulations at 10 CFR 20, DOE Order 5400.5 and NRC Regulatory Guide 8.37 contain an "ALARA" (As Low As Reasonably Achievable) approach, which sets forth an objective to attain dose levels as far below the dose limits as practicable. Moreover, EPA believes that individual sources of contamination should be kept to a small fraction of the primary limit of 100 millirem per year, and generally sets annual dose standards below a couple of tens of millirems.

As a result of the above considerations, 40 CFR 192.12(b)(2) is not appropriate for use at the Residential Areas site, and thus is not an ARAR.

Although meant to apply to outdoor situations, the gamma exposure rate standard found at Section 332.150(b)(2) of the Illinois Administrative Code is a TBC for indoor gamma exposure rate, since the intent is to limit public exposure to site-related radioactive materials, and since periods of occupancy are higher indoors than outdoors.

As with outdoor gamma exposure rate, normal background values for indoor gamma exposure rate will fall within a range and in a fairly predictable statistical pattern; background is not a single value and must be treated statistically. In addition, different building materials (such as bricks, concrete blocks and granite hearths) that contain naturally occurring radiological materials could cause elevated indoor gamma readings that are unrelated to thorium mill tailings. For these reasons, U.S. EPA will use measurements of indoor gamma exposure rate as a "finding tool" to locate contaminated areas that may be below or alongside the foundations of buildings. Elevated indoor gamma readings alone generally will not trigger a cleanup action unless combined with soil sampling data that exceeds the soil concentration criterion and confirms the presence of thorium mill tailings.

Therefore,

The Discovery and Characterization Criterion for indoor gamma exposure rate will be the statistical exceedance of background, based upon the Illinois Administrative Code, Section 332.150 (b) (2).

As with outdoor gamma exposure rate, a statistical method will be applied to both establish background and what is distinctly above background.

- Indoor Radon/Thoron Decay Product Concentrations

Standards dealing with indoor radon decay product concentrations are found at 40 CFR 192.12 (b) (1), which states that:

"In any occupied or habitable building-- The objective of remedial action shall be, and reasonable effort shall be made to achieve, an annual average (or equivalent) radon decay product concentration (including background) not to exceed 0.02 WL. In any case, the radon decay product concentration (including background) shall not exceed 0.03 WL..." (WL, or working levels, is a measure of the concentration of radon decay products.)

While radon-222 (commonly known just as radon) is produced from the Uranium Decay Series, radon-220 (commonly known as thoron) is the Thorium Decay Series form of radon. 40 CFR 192.40 (b) states that the provisions of the standard applicable to radon also apply to thoron. U.S. EPA interprets the radon decay product concentration of 0.02 WL at 40 CFR 192.12 (b) (1) to represent the combined (total) concentration of decay products from both radon and thoron.

In the absence of the thorium mill tailings, naturally-occurring decay product concentrations consist primarily of radon, with thoron decay product levels at about 25% to 50% of those of radon. However, since the thorium decay series radionuclides dominated in the ores used at the factory site, it is reasonable to assume that contaminated properties may show elevated levels of thoron if tailings are located below or

alongside the foundation of a building. However, because of different half lives in the thoron decay series, and depending on the location of the tailings, not every contaminated property will show elevated levels of thoron.

Due to the need for expeditious surveillance, measurements during the discovery and characterization phases will occur over a shorter time frame than the annual average (or equivalent) associated with the wording of the relevant and appropriate requirement. In order to not unduly delay assessments, discovery and characterization measurement periods may be on the order of 2 days to 3 months. Since weather, seasons and home usage all influence indoor radon/thoron levels, these shorter measurements may not fully characterize the annual average but should be adequate to serve as "finding tools."

As with outdoor and indoor gamma exposure rate, there is a natural variability in the range of indoor radon/thoron decay product concentrations. Some areas of West Chicago, as in other parts of the country, may have naturally high levels of indoor radon that are totally unrelated to thorium mill tailings. For these reasons, U.S. EPA will use measurements of indoor radon/thoron decay product concentrations as a "finding tool" to help locate contaminated areas that may be below or alongside the foundations of buildings. Elevated indoor radon/thoron decay product readings alone will not trigger a cleanup action unless combined with soil sampling data that exceeds the soil concentration criterion and confirms the presence of thorium mill tailings.

Therefore,

The Discovery and Characterization Criterion for indoor radon/thoron decay product concentrations is 0.02 WL combined radon and thoron decay products (including background) based upon 40 CFR 192.12 (b) (1).

If a property exceeds this criterion due to naturally-occurring radon, and there is no other indication of thorium mill tailings on the property, the property will not be remediated as part of this Superfund action.

● **"As Low As Reasonably Achievable" (ALARA)**

As discussed above, NRC's regulations at 10 CFR 20, DOE Order 5400.5 and NRC Regulatory Guide 8.37 all contain an ALARA approach which sets forth the objective to attain dose levels as far below the dose limits as practicable. These requirements are TBCs for the removal actions at the Residential Areas.

In addition, Section 340.1000(b) of the Illinois Administrative Code is a TBC for the removal actions at the Residential Areas. Section 340.1000(b), which applies to "licensees and registrants," states,

"In addition to complying with the requirements set forth in this Part, every reasonable effort should be made to maintain radiation exposures, and releases of radioactive materials in effluents to unrestricted areas, as low as is reasonably achievable. The term 'as low as is reasonably achievable' means as low as is reasonably achievable taking into account the state of technology, and the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to the utilization of ionizing radiation in the public interest."

The NRC regulations at 10 CFR 20 contain similar language.

As a result, during discovery and characterization, the following ALARA approach will be used for the Residential Areas site:

Every reasonable effort should be made to maintain radiation exposures, and the amount of radioactive materials in unrestricted areas, to levels that are as low as is reasonably achievable.

VERIFICATION PHASE

Once a property has been designated for a removal action, the success of the operation must be verified during and at the completion of the removal action. During the verification phase, properties will be surveyed and sampled to ensure that cleanup to levels protective of human health and the environment has been achieved.

As indicated below, some of the verification criteria will be applied during and immediately following the removal action, with surveys and samples collected before the open excavation is backfilled with clean material. Some of the verification criteria will be applied later, with surveys and samples collected after the excavation is backfilled.

The criteria to be used during the verification phase are as follows:

- Outdoor Soil Concentrations

The Verification Criterion for this parameter will be soil concentrations that do not exceed 5 picocuries per gram total radium (radium-226 plus radium-228), dry soil, above background, averaged over areas up to 100 square meters, in any 15 centimeter depth based upon Section 332.150(b) of the Illinois Administrative Code.

Samples for outdoor soil concentrations will be collected before backfilling.

Outdoor Gamma Exposure Rates

During cleanup of a property, as during the discovery and characterization phases, outdoor gamma exposure rates will be used as a "finding tool" to help determine where additional excavation may be needed. The main criterion to determine when excavation can cease, however, is the outdoor soil concentration criterion.

However, Section 332.150(b) (2) of the Illinois Administrative Code (which requires that, prior to termination of the license, the licensed site be decontaminated so that "The level of gamma radiation measured at a distance of 100 centimeters from the surface shall not exceed background") is relevant to the Residential Areas, and is appropriate for application at the completion of a cleanup action at a property.

Therefore,

The Verification Criterion for this parameter will be outdoor gamma exposure rates that do not statistically exceed background at a distance of 100 centimeters from the surface, based upon the Illinois Administrative Code, Section 332.150(b) (2).

Outdoor gamma exposure rate surveys to verify that this criterion has been met will be conducted after backfilling. A statistical method will be applied to both establish background and what is distinctly above background.

Indoor Gamma Exposure Rates

For properties that require cleanup and that were found, during discovery and characterization, to have elevated levels of indoor gamma exposure rate due to thorium mill tailings contamination on the property, indoor gamma exposure rate surveys will be used during the cleanup action as a "finding tool" to help determine if additional excavation is necessary.

The Verification Criterion for this parameter will be indoor gamma exposure rates that do not statistically exceed background based upon the Illinois Administrative Code, Section 332.170(c).

For properties that require cleanup, but for which no elevated indoor gamma readings were found during discovery and characterization, indoor gamma surveys will not be conducted during the verification phase.

Indoor Radon/Thoron Decay Product Concentrations

For properties that require cleanup and that were found, during discovery and characterization, to have elevated levels of indoor radon/thoron decay product concentrations due to thorium mill tailings contamination on the property, additional surveys will be conducted at the completion of the cleanup action to determine if the following verification criterion has been met:

In any occupied or habitable building, the objective of remedial action shall be, and reasonable effort shall be made to achieve, an annual average (or equivalent) combined radon and thoron decay product concentration (including background) not to exceed 0.02 WL. In any case, the combined radon and thoron decay product concentration (including background) shall not exceed 0.03 WL. (Based on 40 CFR 192.12 (b) (1) .)

For properties that require cleanup, but for which no elevated indoor radon/thoron decay product concentrations due to thorium mill tailings were found during discovery and characterization, indoor radon/thoron testing will not be required during the verification phase.

• "As Low As Reasonably Achievable" (ALARA)

In addition to meeting the verification criteria described above, the following ALARA approach will be used during cleanup actions:

Every reasonable effort should be made to maintain radiation exposures, and the amount of radioactive materials in unrestricted areas, to levels that are as low as is reasonably achievable.

RELEASE CRITERIA

In addition to the above criteria for discovery, characterization and verification, it will be necessary throughout the project to release equipment from work sites and it may be necessary to assess whether materials or surfaces are suitable for unrestricted use. Requirements for such situations are found in the Illinois Administrative Code, Section 340, Appendix C(a); these requirements are relevant and appropriate for use at the Residential Areas. Similar requirements also are found in the U.S. Nuclear Regulatory Commission's Regulatory Guide 1.86, Table 1; these guidelines are not ARARs (since only promulgated regulations can be ARARs), but the U.S. EPA does consider them to be TBCs.

Both sets of requirements are shown below. Since the requirements are set up with differing units, the most restrictive part for a given situation would be used.

Illinois Administrative Code, Section 340, Appendix C(a)

DECONTAMINATION GUIDES

a) Surface Contamination Guide

Alpha Emitters

Removable	15	pCi per 100 cm ² =	average
	33	dpm per 100 cm ²	over any one surface
	45	pCi per 100 cm ² =	maximum
	100	dpm per 100 cm ²	
Total (fixed)	450	pCi per 100 cm ² =	average
	1,000	dpm per 100 cm ²	over any one surface
	2,250	pCi per 100 cm ²	maximum
	5,000	dpm per 100 cm ²	
	0.25	mRem per hour at 1 cm	

Beta-Gamma Emitters

Removable (all beta-gamma emitters except Hydrogen 3)	100	pCi per 100 cm ²	average over any one surface
	500	pCi per 100 cm ²	maximum
Removable (Hydrogen 3)	1,000	pCi per 100 cm ²	average over any one surface
	5,000	pCi per 100 cm ²	maximum
Total (fixed)	0.25	mRem per hour at 1 cm from surface	

- U.S. Nuclear Regulatory Commission, Regulatory Guide 1.86, Table 1

TABLE 1

ACCEPTABLE SURFACE CONTAMINATION LEVELS

NUCLIDE ^a	AVERAGE ^{b,c}	MAXIMUM ^{b,c}	REMOVABLE ^{b,c}
U-nat, U-235, U-238, and associated decay products	5,000 dpm α per 100 cm ²	15,000 dpm α per 100 cm ²	1,000 dpm α per 100 cm ²
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	100 dpm per 100 cm ²	300 dpm per 100 cm ²	20 dpm per 100 cm ²
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1000 dpm per 100 cm ²	3000 dpm per 100 cm ²	200 dpm per 100 cm ²
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above.	5000 dpm β - γ per 100 cm ²	15,000 dpm β - γ per 100 cm ²	1000 dpm β - γ per 100 cm ²

^a Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides should apply independently.

^b As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

^c Measurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each such object.

^d The maximum contamination level applies to an area of not more than 100 cm².

^e The amount of removable radioactive material per 100 cm² of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

Criteria Not Chosen for Discovery, Characterization or Verification

Discussed below are other parameters and their associated regulations and standards that were reviewed by U.S. EPA to determine whether they were ARAPs and should be used as discovery, characterization and/or verification criteria. None of these standards is applicable to the removal action and, as explained below, none is relevant and appropriate.

• Outdoor Radon Concentrations

Outdoor radon (radon-222) and thoron (radon-220) are regulated in Section 332.170(b) of the Illinois Administrative Code:

"During the operating life and facility decommissioning, the combined concentration of radon and thoron at the boundary of the licensed site, measured at a height of one meter from the surface, averaged annually, shall not exceed three picocuries per liter above the background concentration at the licensed site."

Even though on its terms the regulation applies only to a licensed facility, the intent of the regulation is to control radon and thoron in off-site areas, since the point of compliance is at the boundary of the licensed site. Therefore, the U.S. EPA considers the regulation to be relevant to the Residential Areas.

However, there are practical reasons why measurements for radon and thoron outdoors will not aid in the identification of contaminated properties not otherwise identified by outdoor gamma exposure rate surveys and outdoor soil concentration samples. These reasons are as follows: (1) Reliable radon and thoron measurements are not immediate, but can take days or weeks to measure good averages. Gamma surveys, on the other hand, can provide instantaneous measurements; (2) Unless the emissions are extremely large, radon and thoron emitted from the ground surface will rapidly mix in the open air, making them indistinguishable from naturally occurring radon and thoron. Large radon and thoron emissions would be associated with large contaminant deposits easily identifiable by gamma survey instruments; (3) Because radon and thoron are gases that can be transported by the wind, it would be much harder to pinpoint the emission site.

Therefore, for the reasons stated above, outdoor radon concentrations (radon and thoron), though relevant, are not appropriate to these circumstances and will not be one of the criteria for this response action.

• Radon Release Rates from Soil

The emission of radon (radon-222) and thoron (radon-220) from soils is regulated in Section 332.170(c) of the Illinois Administrative Code, which states:

"The disposal area shall be designed so that after reclamation and stabilization, the annual total radon release rate through the cover from the byproduct material shall not exceed two picocuries per square meter per second."

This regulation only applies to the disposal area at a licensed facility, but the intent of the regulation is to control the total radon emission to the environment and to protect the general population.

However, Section 332.240(a) of the Illinois Administrative Code states:

"Monitoring for total radon after installation of an appropriately designed cover is not required. Total radon emissions from cover material shall be estimated as part of developing a closure plan."

Since it appears that the State never intended that actual measurements be made to show compliance with the regulation, the U.S. EPA does not consider this regulation to be relevant and appropriate for use at the Residential Areas. In addition, there are other, practical reasons why measurements of radon and thoron emissions from soil would not be an appropriate indicator of contaminants. At the Residential Areas, thoron is the dominant radon isotope of concern. If thoron is produced at a depth of more than a few inches below the ground surface, it will radioactively decay to a solid element and cease moving through the soil before reaching the surface. Soil sampling, on the other hand, will find contaminants at much greater depth, as would gamma exposure rate measurements which penetrate soil depths on the order of several feet.

Consequently, measurements for radon and thoron emission rates will not be conducted during this response action.

- Doses in the General Environment

Thorium-related doses in the general environment are regulated in 40 CFR 192.41(d), which states:

"Operations...shall be conducted in such a manner as to provide reasonable assurance that the annual dose equivalent does not exceed 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other organ of any member of the public as a result of exposures to the planned discharge of radioactive materials, radon-220 and its daughters excepted, to the general environment."

Doses in the general environment also are regulated in Section 332.170(a) of the Illinois Administrative Code, which states:

"At all times, concentrations of radioactive material, excluding radon, thoron, and their progeny, which may be released to the general environment in groundwater, surface water, air, soil, or other means shall not result in a committed effective dose in excess of 25 millirem (0.25 mSv) to the whole body, and a

committed dose equivalent in excess of 75 millirem (0.75 mSv) to the thyroid, and 25 millirem (0.25 mSv) to any other organ of any member of the public."

* mSv designates milliSieverts, a dose unit equal to 100 millirem.

Neither of the above regulations is applicable to the Residential Areas, but the U.S. EPA considers both to be relevant.

Even though the dose requirements of 40 CFR 192.41(d) and Section 332.170(a) of the Illinois Administrative Code are relevant to the Residential Areas, there are practical reasons why performing dose assessment calculations will not aid in the identification of contaminated properties not otherwise detected by the other discovery criteria. An operational assumption for this response action is that where site parameters such as indoor or outdoor gamma exposure rate, outdoor soil concentrations, or indoor radon and thoron are elevated, dose is elevated proportionally. Therefore, having specific dose calculations is not appropriate as it will not provide useful information not already provided by other parameters. Consequently, no separate dose assessment calculations will be required for this response action.

ATTACHMENT 2

U.S. ENVIRONMENTAL PROTECTION AGENCY REMOVAL ACTION

ADMINISTRATIVE RECORD FOR FAMILY GOLF COURSE/LAKE SHORE EAST SITE CHICAGO, COOK COUNTY, ILLINOIS

ORIGINAL
JUNE 28, 2002

<u>NO.</u>	<u>DATE</u>	<u>AUTHOR</u>	<u>RECIPIENT</u>	<u>TITLE/DESCRIPTION</u>	<u>PAGES</u>
1	07/26/00	Magellan Development, Ltd.	International Engineering Consultants, Inc.	Map: Plat of Survey at Lower Level, Lakeshore East, East of Columbus Drive	1
2	03/30/01	Linnane, S., Magellan Development Group	Simon, V., U.S. EPA	Cover Letter Forwarding the Land Plan, Phase I Environmental Assessment and Geotechnical Report for the Lakeshore East Site	1
3	03/30/01	Simon, V., U.S. EPA	Linnane, S., Magellan Development Group	Letter: Possible Radiological Contamination at the Lakeshore East Site	4
4	04/09/01	Chicago Sun-Times	Public	Newspaper Article: "New East Side" is Old Hat; 'Lakeshore East' Wins Favor"	1
5	05/23/01	Simon, V., U.S. EPA	Linnane, S., Magellan Development Group	Letter re: Consent for Access to Property Form for the Lakeshore East Site	5
6	06/00/01	U.S. EPA	U.S. EPA	Map: Gamma Level Survey of Family Center Golf Course in Downtown Chicago (DRAFT)	1
7	06/14/01	Linnane, S., Magellan Development Group	Simon, V., U.S. EPA	Fax Transmission re: Signed Consent for Access to Property Form for the Illinois Center Golf Course	2
8	07/02/01	Simon, V., U.S. EPA	Linnane, S., Magellan Development Group	Letter re: Lakeshore East Radiation Anomalies	4

<u>NO.</u>	<u>DATE</u>	<u>AUTHOR</u>	<u>RECIPIENT</u>	<u>TITLE/DESCRIPTION</u>	<u>PAGES</u>
9	07/02/01	U.S. EPA	File	Attendance List for the July 2, 2001 Meeting re: the Gamma Survey at the Family Center Golf Course	1
10	07/03/01	Simon, V., U.S. EPA	Carlins, D., Magellan Development Group	Cover Letter Forwarding Clipboard Data for the Lakeshore East Site	1
11	07/12/01	Martwick, C., U.S. EPA	Smith, J., Covington & Burling	Letter re: Draft Gamma Level Survey of the Family Center Golf Course	1
12	07/12/01	Riggs, J., Consolidated Engineering Services	Simon, V., U.S. EPA	Letter re: Request for Public Information Concerning the Golf Center at 221 N. Columbus Drive	1
13	07/16/01	Linnane, S., Magellan Development Group	Simon, V., U.S. EPA	Letter re: Delineation of Contamination Anomalies at the Lakeshore East Site	1
14	07/26/01	Simon, V., U.S. EPA	Linnane, S., Magellan Development Group	Letter re: Delineation of Contamination Anomalies at the Lakeshore East Site	1
15	07/30/01	Torres, S., & R. Berggreen, STS Consultants, Ltd.	Bezark, S., Alzheimer & Gray	Letter Confirming Agreement for Environmental Gamma Radiation Survey of 26-Acre Site at Lakeshore East w/ Attached General Conditions of Service	12
16	08/02/01	Bezark, S., Alzheimer & Gray	Simon, V., U.S. EPA	Letter: STS Consultants Plans to Conduct Step Out and Down Hole Borings at Lakeshore East	1
17	09/17/01	Warren, A., Michael Best & Friedrich, LLC	Jensen, L., U.S. EPA	August 22, 2001 Report for Survey Activities at 221 North Columbus Drive Performed on July 27 and July 30-August 1, 2001 w/ Fax Transmission Cover Sheet	13

<u>NO.</u>	<u>DATE</u>	<u>AUTHOR</u>	<u>RECIPIENT</u>	<u>TITLE/DESCRIPTION</u>	<u>PAGES</u>
18	09/19/01	STS Consultants, LTD	Loewenberg and Associates & Illinois Center Plaza Venture	Report re: Radiation Survey, 26-Acre Site, Southwest Corner Wacker Drive and Lake Shore Drive, 221 N. Columbus Drive w/ Appendices, Maps and Cover Letter	171
19	10/01/01	Fulgham, M., U.S. EPA	Warren, A., Michael Best & Friedrich	Letter: Survey Activities at 221 North Columbus Drive	1
20	10/02/01	Torres S. & R. Berggreen, STS Consultants, Ltd.	Lippe, M., Illinois Center Plaza Venture & J. Loewenberg, Loewenberg and Associates	Letter re: Addendum to Report for Results of Expanded Gamma Radiation Survey at 26-Acre Site, 221 North Columbus Drive	4
21	10/11/01	Linnane, S., Magellan Development Group, Ltd.	Simon, V., U.S. EPA	Cover Letter Forwarding Radiation Survey and Addendum for the 26 Acre Site at Lakeshore East	1
22	10/12/01	Reader	Public	Newspaper Article: "This Land is Whose Land: The Uncertain Future of a Prime Patch of Undeveloped Lakeshore Real Estate"	3
23	11/06/01	Simon, V., U.S. EPA	Linnane, S., Magellan Development Group & R. Berggreen, STS Consultants, Inc.	Letter re: U.S. EPA's Review of the Radiation Survey for the 26-Acre Site at the Southwest Corner of Wacker Drive and Lake Shore Drive w/ Attachment	11
24	01/08/02	Torres, S. & R. Berggreen, STS Consultants, Ltd.	Carlins, D., Magellan Development Group, & S. Bezark, Alzheimer and Gray	Letter: Test Pit Explora- tions at 26-Acre Golf Course Site, South- west Corner of Wacker Drive and Lake Shore Drive	3

<u>NO.</u>	<u>DATE</u>	<u>AUTHOR</u>	<u>RECIPIENT</u>	<u>TITLE/DESCRIPTION</u>	<u>PAGES</u>
25	01/09/02	Carlins, D., Magellan Development Group, Ltd.	Micke, F., U.S. EPA	Letter: Test Pit Explora- tions at 26-Acre Golf Course Site, Southwest Corner of Wacker Drive and North Shore Drive	4
26	01/17/02	Martino, F. Argonne National Laboratory	Jensen, J. U.S. EPA	Fax Transmission re: Soil Sample Results for the Family Golf Centers/ Lakeshore East Site	4
27	02/08/02	Jensen, L., U.S. EPA	Simon, V. & F. Micke; U.S. EPA	Memorandum re: Review of Family Golf Centers Data from Argonne National Laboratory and from RSSI	11
28	02/17/02	<i>Chicago Tribune</i>	Public	Newspaper Article: "Under Construction?"	4
29	02/20/02	<i>Chicago Sun-Times</i>	Public	Newspaper Article: "Building Sale Suggests Jobs-for-Condos Switch"	1
30	03/11/02	Micke, F., U.S. EPA	Port, E., RSSI & F. Martino, Argonne National Laboratory	Letter re: Review of Gamma Spectroscopy Data for the Family Golf Centers/Lakeshore East Site	4
31	03/14/02	STS Consultants, Ltd.	U.S. EPA	Final Report for the Lakeshore East Additional Radiation Survey Investi- gation w/ Cover Letter	299
32	04/15/02	U.S. EPA	File	Attendance List for the April 15, 2002 Lakeshore East Meeting	1
33	04/17/02	Berggreen, R., STS Consultants, Ltd.	Simon, V., U.S. EPA; et al.	FAX Transmission re: Corrected Pages from the February 8, 2002 Lake- shore East Additional Radiation Survey Investigation	7

<u>NO.</u>	<u>DATE</u>	<u>AUTHOR</u>	<u>RECIPIENT</u>	<u>TITLE/DESCRIPTION</u>	<u>PAGES</u>
34	04/22/02	Berggreen, R., STS Consultants, Ltd.	Micke, F., U.S. EPA; et al.	Transmittal Letter Forwarding Attached Drawings for the Lakeshore East Site	7
35	04/23/02	Micke, F., U.S. EPA	Port, E., RSSI	Letter re: Analysis of Samples Collected at the Family Golf Center	2
36	00/00/00	Simon, V. & F. Micke, U.S. EPA	Muno, W., U.S. EPA	Action Memorandum: Determination of Threat to Public Health or the Environment and Need for Time Critical Removal Action at the Family Golf Course/Lake Shore East Site (PENDING)	

Family Golf Center/Lake Shore East Chicago,IL

